Advances in Chemistry Research, 2015, vol.28, pages 145-169

Polyammonium derivatives of (thia)calix[4]arene: Synthesis and interaction with nucleic acids

Yakimova L., Puplampu J., Vavilova A., Stoikov I.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2015 Nova Science Publishers, Inc. Targeted delivery of polynucleic acids in cells (transfection) for therapeutic purposesis limited by a number of obstacles, starting from the cell membrane to the geneexpression. To overcome the cell barriers, the use of gene carriers - viral and non-viralvectors are employed. One of the current approaches employed in the development ofsynthetic nonviral vectors is the functionalization of easily accessible molecularplatforms with receptor groups (amino, ammonium or guanidinium groups), capable ofinteracting with nucleic acids.In this chapter, we examine recent advances in the design and development ofsynthetic vectors, and the principles underlying their interactions with nucleic acids. Thefocus will be on recent advances in the design and synthesis of potential transfectionagents based on the (thia)calixarene platform functionalized with different polyaminofragments differing in the number of amino groups, the length of their alkyl linker chainsand the present or absent of hydroxy groups. The interaction of functionalized(thia)calixarene derivatives with DNA will also be discussed.

Keywords

(Thia)Calixarenes, DNA, Oligoamines, Synthesis, Transfection